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10/774,593	02/10/2004	Katsuhiko Nakata	1341.1183	9572

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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/774,593	NAKATA ET AL.	
	Examiner	Art Unit	
	Matthew D. Hoel	3714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 9, 10, 14, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Rosenberg, et al. (U.S. pre-grant publication 2002/0021283 A1, application 09/934,739).

3. As to Claim 1: '283 teaches an object interaction expression apparatus for expressing interactions between plural objects that move by simulation in a virtual space (Abst., Figs. 5a,b). '283 has an expression mode storing unit that stores in a correlated form an interaction magnitude of an object and a corresponding expression mode in which the interaction magnitude will be expressed (application program driving force feedback, stored on computer platform, Para. 46 and 47; force feedback models, Para. 15 and 16). '283 has an interaction magnitude unit that calculates interaction magnitudes of objects that interact with each other (low-level force command generated with sensor data, Fig. 3; forces between to interacting paddles, Figs. 8a-c, Para. 160 and 161). '282 has an expression controller that controls an expression of the

interaction magnitude of the objects that interact with each other based on the expression mode stored corresponding to the interaction magnitude calculated (force feedback and visual output provided, Para. 48). Regarding the new limitation of an interaction magnitude providing unit that provides controlled expression of the interaction magnitude of the objects of the user, the examiners believes this is anticipated by '283. Figs. 6a-i, Para. 141 to 146, show forces modeling the interaction between a paddle and a ball, which is an example of a collision. Figs. 7a-c, Para. 147, simulates an obstruction force being a virtual wall and can simulate a solid, impenetrable wall. For practicality and safety, the force is limited to prevent injury to the user and damage to the equipment. Para. 15 discusses the force fed back being proportional to the amount of deformation in a collision. Para. 43 and 44 discuss sporting simulations that would involve collisions, such as tennis, badminton, racketball, hockey, etc., all of which involve hitting a ball or a puck. Para. 82 discusses the amount of force applied to the controls being determined by velocity and acceleration at the time of collision. These passages are analogous to Fig. 2B of the applicants' specification which describes a force in the form of a vibration which increases roughly proportionally to the amount of deformation in a vibration. The fed-back forces of '283 are not vibrating forces like those of applicants' Fig. 2B, but they are forces nonetheless, and fairly anticipate the claimed limitations. Vibrating forces are not specified in the independent claims.

4. As to Claims 9 and 14: '283 teaches a method for expressing interactions between plural objects that move by simulation in virtual space (Abst., Figs. 5a,b). '283

stores in a correlated form an interaction magnitude of an object and a corresponding expression mode in which the interaction magnitude will be expressed (application program driving force feedback, stored on computer platform, Para. 46 and 47; force feedback models, Para. 15 and 16). '283 calculates interaction magnitudes of objects that interact with each other (low-level force command generated with sensor data, Fig. 3; forces between to interacting paddles, Figs. 8a-c, Para. 160 and 161). '283 controls an expression of the interaction magnitude of the objects that interact with each other based on the expression mode stored corresponding to the interaction magnitude calculated (force feedback and visual output provided, Para. 48). Regarding the new limitation of an interaction magnitude providing unit that provides controlled expression of the interaction magnitude of the objects of the user, the examiners believes this is anticipated by '283. Figs. 6a-i, Para. 141 to 146, show forces modeling the interaction between a paddle and a ball, which is an example of a collision. Figs. 7a-c, Para. 147, simulates an obstruction force being a virtual wall and can simulate a solid, impenetrable wall. For practicality and safety, the force is limited to prevent injury to the user and damage to the equipment. Para. 15 discusses the force fed back being proportional to the amount of deformation in a collision. Para. 43 and 44 discuss sporting simulations that would involve collisions, such as tennis, badminton, racketball, hockey, etc., all of which involve hitting a ball or a puck. Para. 82 discusses the amount of force applied to the controls being determined by velocity and acceleration at the time of collision. These passages are analogous to Fig. 2B of the applicants' specification which describes a force in the form of a vibration which increases roughly proportionally

to the amount of deformation in a vibration. The fed-back forces of '283 are not vibrating forces like those of applicants' Fig. 2B, but they are forces nonetheless, and fairly anticipate the claimed limitations. Vibrating forces are not specified in the independent claims. These two claims are identical except that one is a method claim and another is properly cited computer-executable instructions on a computer-readable medium for carrying out the steps of the method.

5. As to Claims 2, 10, and 15: The interaction magnitude calculating unit of '283 calculates the interaction magnitude from a distance between the objects (restoration force of collision related to speed and distance traveled by objects, Para. 160).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 3, 4, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over '283 in view of Tarr (U.S. patent 6,191,796 B1).

9. As to Claims 3 and 4: '283 discloses all of the elements of Claims 3 and 4, but lacks specificity as to the collisions being elastic deformations of the objects or plastic deformations of the objects. '283 teaches the interaction magnitude calculating unit that calculates the interaction from the distance between the objects after a collision (restoration for of collision related to speed and distance traveled by objects after collision, Para. 160). '796, however, teaches that the interaction between objects may be a collision (Col. 2, Lines 1 to 24), and further teaches that the interaction may be elastic or plastic (Col. 2, Lines 25 to 34). It would be obvious to one of ordinary skill in the art to apply the elastic and plastic collisions of '796 to the force feedback system of '283. '283 in Para. 151 describes a restoring force felt by the user when he or she pushes into a virtual wall; this would be amenable to simulation by the plastic representation of '796 used to model permanently deformable surfaces (Col. 2, Lines 27 to 31). Para. 141 of '282 describes a restoring force by a resilient, not rigidly solid, paddle interacting with a ball during a game; this would be amenable to simulation by the elastic representation of '796 used to model resilient compliant surfaces (Col. 2, Lines 31 to 34). The advantage of this combination would be to enhance the realism of the simulation by allowing either type of real-world collision to be accurately simulated.

10. As to Claims 11 and 16: '283 teaches the interaction magnitude calculating unit that calculates the interaction from the distance between the objects after a collision (restoration for of collision related to speed and distance traveled by objects after

collision, Para. 160). '796 teaches that the interaction between objects may be a collision (Col. 2, Lines 1 to 24), and further teaches that the interaction may be elastic or plastic (Col. 2, Lines 25 to 34).

11. Claims 5, 6, 12, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over '283 in view of Gagne, et al. (U.S. patent 5,731,819 A).

12. As to Claim 5: '283 discloses all of the elements of Claim 5, but lacks specificity as to calculating the interaction magnitude in terms of a denting. '819, however, teaches calculating the interaction magnitude in terms of a denting amount (deformation and maximum deformation set in response to motion to simulate inertia, Abst.). It would be obvious to one of ordinary skill in the art to apply the calculated denting amount of '819 to the force feedback system of '283. Figs. 6a-h of '283 simulate the interaction of a player's paddle with a ball (Para. 141 to 146); this is displayed visually (Figs. 8a-c, Para. 156 to 158). '819 accurately visually depicts flexing of a body in terms of a deformation quantity in response to simulated motion (Col. 1, Line 65 to Col. 2, Line 63). The advantage of this combination would be to accurately simulate the force feedback felt by the player synchronized with the visual deformation cues visually seen by the player.

13. As to Claims 6, 12, and 17: The correlated expression modes of '283 simultaneously show a visual expression mode and a tactile expression mode. Figs. 6a-h of '283 simulate the interaction of a player's paddle with a ball (Para. 141 to 146); this is displayed visually (Figs. 8a-c, Para. 156 to 158). '819 accurately visually depicts

flexing of a body in terms of a deformation quantity in response to simulated motion (Col. 1, Line 65 to Col. 2, Line 63).

14. Claims 7, 8, 13, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over '283 and '796 in view of Pryor (U.S. patent 5,982,352 A).

15. As to Claim 7: The combination of '283 and '796 discloses all of the elements of Claim 7, but lacks specificity as to storing pre-collision and post-collision interaction magnitudes expressed by changing colors and impact vibrations. '352, however, teaches the expression mode storing unit storing pre-collision and post-collision interaction magnitudes by correlating the interaction magnitudes with the expression mode expressed by changing colors, and the interaction magnitudes during collision by correlation the interaction magnitudes with a impact waveform. '352 is able to capture and store pre-collision and post-collision magnitudes (Col. 3, Lines 55 to 13). '352 uses cross polarization to visually capture stresses in the objects as the are strained during impact, thus correlating the interaction magnitudes with the expression mode expressed by changing colors, and correlated with an impact waveform (Col. 18, Lines 48 to 64). '352 is able to capture events and display visual information and force feedback coordinated to the impact event (Col. 4, Lines 4 to 44). It would be obvious to one of ordinary skill in the art to apply the waveform storage and changing colors of '352 to the combination of '283 and '796. Figs. 6a-h of '283 simulate the interaction of a player's paddle with a ball (Para. 141 to 146); this is displayed visually (Figs. 8a-c, Para. 156 to 158). The visual stress simulation would more accurately convey to the player the

stresses involved in the interaction between the ball and the paddle in Figs. 6a-h of '283. '352 teaches tactile feedback being added to the system (Col. 5, Lines 39 to 45). The advantage of this combination would be to more accurately and perceptibly correlate the visual display and force feedback to the player by visually displaying the stress placed on the object by the player's interaction.

16. As to Claim 8: '352 teaches the objects being constituent elements of a product, and the expression modes that express the interaction magnitude constitute modes comprehensible by a designer of the product. '352 teaches tactile feedback being added to the system (Col. 5, Lines 39 to 45). One of the primary embodiments of '352 is CAD (computer-aided design), in which a user is able to three-dimensionally visualize and haptically interact with the product being designed (Fig. 3; Col. 12, Line 1 to Col. 13, Line 15; Col. 5, Lines 39 to 45).

17. As to Claims 13 and 18: '352 teaches the expression mode storing unit storing pre-collision and post-collision interaction magnitudes by correlating the interaction magnitudes with the expression mode expressed by changing colors, and the interaction magnitudes during collision by correlation the interaction magnitudes with a impact waveform. '352 is able to capture and store pre-collision and post-collision magnitudes (Col. 3, Lines 55 to 13). '352 uses cross polarization to visually capture stresses in the objects as the are strained during impact, thus correlating the interaction magnitudes with the expression mode expressed by changing colors, and correlated with an impact waveform (Col. 18, Lines 48 to 64). '352 is able to capture events and

display visual information and force feedback coordinated to the impact event (Col. 4, Lines 4 to 44).

Response to Arguments

18. Applicant's arguments filed 2-6-2007 have been fully considered but they are not persuasive. Regarding the new limitation of an interaction magnitude providing unit that provides controlled expression of the interaction magnitude of the objects of the user, the examiners believes this is anticipated by '283. Figs. 6a-i, Para. 141 to 146, show forces modeling the interaction between a paddle and a ball, which is an example of a collision. Figs. 7a-c, Para. 147, simulates an obstruction force being a virtual wall and can simulate a solid, impenetrable wall. For practicality and safety, the force is limited to prevent injury to the user and damage to the equipment. Para. 15 discusses the force fed back being proportional to the amount of deformation in a collision. Para. 43 and 44 discuss sporting simulations that would involve collisions, such as tennis, badminton, racketball, hockey, etc., all of which involve hitting a ball or a puck. Para. 82 discusses the amount of force applied to the controls being determined by velocity and acceleration at the time of collision. These passages are analogous to Fig. 2B of the applicants' specification which describes a force in the form of a vibration which increases roughly proportionally to the amount of deformation in a vibration. The fed-back forces of '283 are not vibrating forces like those of applicants' Fig. 2B, but they are forces nonetheless, and fairly anticipate the claimed limitations. Vibrating forces are not specified in the independent claims. The 101 rejections are withdrawn as Claims 9 and

14 have a concrete, tangible, and useful result as a force magnitude is expressed to the user. Claim 14 properly cites computer-executable instructions on a computer-readable medium for executing the steps of a statutory method. The examiner respectfully disagrees with the applicants as to the claims' condition for allowability.

Conclusion

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

20. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew D. Hoel whose telephone number is (571) 272-5961. The examiner can normally be reached on Mon. to Fri., 8:00 A.M. to 4:30 P.M.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert E. Pezzuto can be reached on (571) 272-6996. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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